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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/558,819	04/26/2000	Toshihiko Koseki	JA9-1998-0203US1	1693

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EXAMINER	
PARKER, KENNETH	

ART UNIT	PAPER NUMBER
2871	

DATE MAILED: 08/13/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 09/558,819	Applicant(s) KOSEKI ET AL.	
	Examiner Kenneth A Parker	Art Unit 2871	

-- The MAILING DATE of this communication appears on the cover sheet with th correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE ____ MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on *16 May 2002* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-29* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-29* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other:

DETAILED ACTION

Claim Rejections - 35 USC § 112

Claims 1-3, 6-27 and 29 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

With respect to claims 1-3, 29, the constant K in equations for dynamic hardness and "hardness of plastic deformation" is not appear to be a set variable, therefore these equations cannot be used for any calculations of the values in question.

With respect to claims I3-19, 29, the expression "ratio of the diameter of the upper bottom to that of the diameter" has no discernable meaning.

With respect to claims 20-27,29, sentence "said spacers have length of one side of the upper bottom, which is equal to one side of the lower bottom and a horizontal surface in the position decreased by certain ratio from the maximum height of said spacers or the diameter of the upper bottom, which is equal to that of the lower bottom" has no discernable meaning.

Claim Rejections - 35 USC § 103

2. **Claims 1-29 are rejected under 35 U.S.C. 103(a) as being unpatentable ov r Shioda et al, U.S. Patent #6,299,949 in view of Kajita et al, U.S. Patent #6,275,280.**

Please note, in accordance with MPEP 2112, WHEN THE STRUCTURE RECITED IN THE REFERENCE IS SUBSTANTIALLY IDENTICAL TO THAT OF THE CLAIMS, CLAIMED PROPERTIES OR FUNCTIONS ARE PRESUMED TO BE INHERENT. As the liquid crystal cell structure is shown, even if the properties were considered definite and not disclosed by Shioda, it is incumbent upon applicant to show an unobvious difference with respect to the claimed properties.

With respect to claims 1 -4, Shioda et al disclose "a liquid crystal display device which comprises two substrate, a liquid crystal sandwiched and supported between the two substrate, and spacers, for maintaining a predetermined substrate substrate spacimg, provided on at least one of the substrates in its portion where the liquid crystal sandwiched and supported, the spacers being formed of photocured resin layer the photocured resin layer having a Young's modulus, derived from a stress-strain curve, of not

more than 10,000 MPa at 25 d. C. (=1, 000 kgflmm2 - VL) and not less than 10 Mpa at 150 d. C. (= 1 kgflmm2 -VL)" They also disclose, as another aspect of their invention, the spacers being formed of a photocured resin layer, wherein the photocured resin layer has a dynamic hardness value of 30 to 60 under load." See col.3, lines 14 -28.

Lacking from the disclosure of Shioda et al is the exact range of value of DH and any value of HV. However, as the value of K can be arbitrary selected, this limitation is inherently met by any reference. Further, if the DH has the same units as those of Shioda et al. the limitation would be obvious over Shioda et al. They do not disclose the identical range of applicant with respect to the variable DH, however they disclose a range which either overlaps at the end point, or substantially close. As it has been judicially determined that overlapping ranges are at least obvious, the range of Shioda et al would have been obvious over the claimed range.

As to HV, Shioda et al disclose that the degree of plastic deformation is related to and described by DH. (See col.15, 1-25). In other words, the range of DH as defined by Shioda et al also defines a certain range of HV even though they do not disclose specific values. Moreover, since the range of DH, disclosed by Shioda et al is close or overlaps with those of the applicant, the same is true for VH (see the previous paragraph). On the other hand, as the value of K can be arbitrary selected, this limitation is inherently met by any reference. Also, it was well known in the art that the dynamic hardness should fall within a certain hardness value range "from the viewpoint of avoiding dynamic instability". See col.13, lines 1-14; col.23, lines 1-7. Since plastic deformation is defined by dynamic hardness (see col.15, lines 1-16) it also should fall within a certain range to avoid the dynamic instability.

They also disclose: "the storage modulus as determined as dynamic viscoelasticity measurement (=elastically deformable component, that is a component of which the shape can be returned to the original shape) should be not more than specified value in the above temperature range, provided that the storage modulus should be not than the certain value from the viewpoint of avoiding dynamic instability. Further the loss tangent (=proportion of the deformation; the larger this proportion, the larger the amount of the plastically deformable component) should not be more than the specified value. Further, the Young's modulus derived from a stress-strain curve should be not more than the specified value at 25 d. C., provided that the Young's modulus should be not less than a certain value from the viewpoint of avoiding dynamic instability. Further, the dynamic hardness should fall within a certain hardness value range." See col.13, lines 1-33, col.2, line 55 -col.3, line 28.

With respect to **claim 5, Shioda** et al disclose: "After preparation of liquid crystal cells, a reliability test is carried out. When the coefficient of thermal expansion of the resin constituting the spacer is larger than that liquid crystal, the cell cannot cope withthe thermal expansion the liquid crystal. In this case the pressure within the cells becomes lower than the atmospheric pressure, and air enters through the sealed portion, often leading to a foaming phenomenon. Therefore, the properties required of the spacer are those of liquid crystal devices in the temperature range of -40 d.C. to 80 d.C., that is in such a temperature range that reliability is generally required of the liquid crystal devices.

With respect to **claims 6-11, Shioda** et al teaches: "The spacer may be disposed in a proper density, such as a density of one spacer per four pixel or one spacer per one pixel. The spacer density in terms of volume density is generally 0.1 to 5%, preferably 0.3 to 2%, from the

viewpoint of the function of the spacer. When the volume density of the spacer exceeds the upper limit of the above density range, the pouring efficiency in the step of pouring the liquid crystal is unfavorably lowered. On the other hand, a smaller volume density than the lower limit of the above volume density range is causative of the deformation of the spacer at the time of cell assembling. The surface area density of the spacer is generally 50 to 2,000 m2 /mm2, preferably 500 to 1,000 m2 /mm2. A surface area density smaller than the lower limit of the above surface area density range is causative of the deformation of the spacer at the time of cell assembling, while when the surface area density exceeds the above surface area density range, the pouring efficiency in the step of pouring the liquid crystal is unfavorably lowered. See col.16, lines 25-42.

When one spacer is provided for each size of 100 mx300 m in color pixel, about 33 spacers can be formed in 1 mm . This value is smaller than 100 spacers/mm, the number of spacers per mm in the case of the conventional technique." See col.16, lines 50-54.

Lacking from the disclosure is exact range of value of the spacer density. Shioda et al do not disclose the identical range of the applicant with respect to the spacer density, however, they disclose a range which either overlaps or substantially close. As it has been judicially determined that overlapping ranges are at least obvious, the range of Shioda et al would have been obvious over claimed range.

With respect to claim12-27, Shioda et al disclose that "the shape of the spacer formed by development may be, for example, a trapezoid having a height 2 to 10 m, and the edge of the spacer may be a round spherical form or an angular rectangular form." See col.16, lines 43-49.

Lacking from the disclosure of Shioda et al is detailed discussion of the any exact shape of spacers. However it is well known in the art that the sizes, position and number of spacers are determined in accordance with the rigidity of the liquid crystal panel and, thus, is a design choise.

With respect to claims 28,29 Shioda et al also teach "a process for producing this liquid crystal display device, comprising the steps of: providing substrates between which a liquid crystal display device is to be sandwiched and supported; coating a photosensitive resin composition onto at least one of the substrate in its portions, where the liquid crystal is to be sandwiched and supported, to a thickness of spacers; providing a photomask on the coating, exposing the coating; and developing the exposed coating to form a photocured resin layers as spacers, the photocured resin layer having a dynamic hardness of 30 to 60 under load." See col.4, line 62 - col.5, line23.

By claiming a dynamic hardness of 30 to 60, Shioda et al fail to include a range of dynamic hardness of 26 to 30 and "hardness of plastic deformation" from 38 to 46. However, it was well known in the art that the dynamic hardness should fall within a certain hardness value range "from the viewpoint of avoiding dynamic instability". See col.13, lines 1-14; col.23, lines 1-7. Since plastic deformation is defined by dynamic hardness (see col.15, lines 1-16) it also should fall within a certain range to avoid the dynamic instability.

Therefore, it would have been obvious to a person of an ordinary skill in the art at the time when the invention was made to choose a particular range of dynamic hardness value, as well as a

corresponding range of plastic deformation value to avoid the dynamic instability.

Shioda et al fail to specifically teach spacers in non-display reason. However, the importance of presence of spacers and their properties and characteristics, as well as their distribution density in this area is well known in the art. For example, Kajita et al teach extensively on spacers in non-display area, in particularly, on their elasticall properties and their distribution. See col.3, line 2 - col.6, line 60; col.9, line 40- col.11, line 20.

Therefore, it would have been obvious to a person of an ordinary skill in the art at the time when the invention was made to introduce spacers of specific mechanical properties and with specific density in non-display area in order for liquid crystal display substrates to withhold a compression force.

Response to Arguments

Applicant's arguments filed have been fully considered but they are not persuasive.

With regard to the value of k, it is still a concern that the value is variable so that the value of the equation is not set, and that the device of Shioda may actually be substantially the same as disclosed by applicant. Additionally, the language "upper bottom" and "lower bottom" are genuinely not understood. Applicant is invited to contact the examiner to discuss these issues and attempt to reach an understanding of the language and technology employed in this application.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kenneth A Parker whose telephone number is 703-305-6712. The examiner can normally be reached on 9:30-6:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, William L. Sikes can be reached on 308-4842. The fax phone numbers for the organization where this application or proceeding is assigned are 703-308-7722 for regular communications and 703-308-7722 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 308-0956.

Kenneth A Parker
Primary Examiner
Art Unit 2871

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August 12, 2002